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Macroclastylus

Humphrey





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AND THEIR RELATION TO TUMOURS.

BY

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Read February 10th, 1891.

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IN the Pathological Museum of the University of Cambridge are the six following specimens and casts.

1. The hypertrophied second toe amputated from a child, æt. 4, by Mr. Morris, of Bishop's Stortford. At birth it was thrice the size of the great toe, and grew more rapidly than the other parts. The phalanges are of great length, but not otherwise diseased. The tendons are proportionately largo, and there is a superabundance of skin and adipose tissue all round.

2. A cast presented by Mr. Cathcart, of Edinburgh, of the giant middle finger of a child æt. 20 months. The condition was congenital; but the finger had grown out of proportion to the other fingers, and was amputated by Mr. Joseph Bell.

3. A cast presented by Mr. Cathcart of the great toe of a girl, æt. 13. The affection was congenital. The second toe had still larger proportions, and was amputated in childhood.

4. A cast, taken and presented by G. May, of Trinity College, of the left foot of a woman, æt. 45, in the London Hospital. The two inner toes and the inner side of the foot hypertrophied from birth.

	Left foot.	Right foot.
The inner border of the foot from the point of the heel to the end of the great toe . . .	13½ in.	10 in.
Circumference of great toe near the end . . .	7	2½
„ of second toe „ . . .	5	1½
Outer border of foot	7	7

The sole is flat, and bulges on the inner side as in “flat-foot.” No similar condition in any member of her family or any of her children.

5. A cast of congenital hypertrophy of the fore and middle fingers of the right hand of a boy æt. 12. The forefinger measures from the metacarpal bone four inches and a half, the second and third phalanges measuring two inches and three quarters, circumference of thickest part three inches and three quarters. The middle finger measures three inches and three quarters in length, in circumference three inches, and is remarkably deflected towards the ulnar side in the second and third phalanges. The thumb and other fingers normal. The cast was presented by Dr. Walker of Peterborough, who amputated the two hypertrophied fingers because they were stiff, much in the way, and a source of mortification to the boy. The growth was not disproportionate to that of the other fingers. There was no similar condition in any member of the family.

6. The cast of the foot of a lad, æt. 9, whom I saw on the beach at Cromer in 1837, and whom I took to the Norwich Hospital, where he was under the care of Mr. Crosse, whose apprenticed pupil I then was. The enlargement, as seen in the accompanying rough sketch, was great, and affected the three inner toes of the right foot.

It was congenital, and proceeded with a rapidity out of proportion to the general growth ; and it was extending upon



the sole more manifestly than in any other direction. The two outer toes were rather smaller than the corresponding toes of the other foot. The mass appeared to be chiefly composed of fat covered with rather coarse skin, and the nails of the hallux and second toe were much larger than natural. The affected toes were much extended, and the extensor tendons tight. No tenderness or pain. The muscles of the leg were enlarged, and the lad could run about as well as other boys. His father, mother, brothers, and sisters were fine, well-made persons. The hypertrophied parts, being unsightly, cumbrous, and increasing,

were removed by Mr. Crosse, the ends of the enlarged metatarsal bones being taken away, and sufficient skin saved from the dorsum of the foot to cover the sole and leave a good useful foot with little deformity or inconvenience. It was necessary to dissect out the fatty substance which extended up between the metatarsal bones. The mass was composed mainly of adipose substance. The bones were enlarged, but not otherwise diseased. The specimen, from which, however, the bones have been removed, is in the museum of the Norwich Hospital; and Mr. Thomas Crosse, the indefatigable curator of the museum, was good enough to take it out of the bottle the other day and verify my recollections of it.

Curling¹ records the case of a girl (No. 7) in whom the fore, middle, and ring fingers of the right hand, and the thumb, index, and middle fingers of the left hand were greatly hypertrophied, all the parts—bones, articulations, integuments, and nails—being developed in excess. The middle finger of the left hand was remarkably curved outwards (to the ulnar side), this having been “occasioned apparently by a displacement of the extensor tendon which forms a bridle along the outer edge;” the movements of the fingers but little impaired. The fingers felt cold. Pulsation in the digital arteries indistinct. The fingers were remarkably large at birth, and had grown out of proportion to the rest of the body. He mentions the following: (No. 8.) A child aged two, seen by Professor Owen, with the middle finger of each hand twice as long and more than twice as thick as the index. (No. 9.) A cast, with particulars by Sir James Paget, of the right hand of a man, aged fifty, with hypertrophied first and second fingers; the second was of enormous size, and curved outwards as in No. 7. The parts bore the same proportion as at birth, and were not the cause of any inconvenience. (No. 10.) The cast of the hand of an adult in the museum of King’s College, with the middle finger congenitally hypertrophied. The hands of other members of the

¹ ‘Medico-Chirurgical Transactions,’ xxviii, 337.

family are reported to have been deformed in a similar manner. (No. 11.) The case of a girl, aged five, by Mr. Power, of Dublin,¹ with the middle finger of the right hand much, and the index and ring finger somewhat enlarged, particularly the ring finger, which was divaricated from the middle in consequence of its abnormal growth. (No. 12.) Dr. John Reid² gives the case of a boy, aged thirteen, in whom there was increased nutrition of the thumb and first finger of the left hand. The enlargement was associated with enlargement of the radial artery and elevation of temperature, was observed at birth, and continued to increase. In this paper Dr. Reid also describes the case (No. 13) of a lad, aged fifteen, with congenital hypertrophy of the whole of the left upper limb including the scapula; and (No. 14) that of a girl, aged two, with congenital hypertrophy of the middle toe which equalled in bulk all the remaining four toes, the phalanges and metatarsal bone being of great size.

Busch, in an excellent article,³ relates two cases. One (No. 15) a man, aged twenty, with congenital hypertrophy and deformity of the three inner toes, which were much over-extended, and the adjacent part of the sole of the right foot, the growth proceeding out of proportion to the rest of the body and advancing along the sole (resembling, in short, No. 6). Pirogoff's amputation was performed. The phalanges, metatarsals, and inner tarsal bones were enlarged, especially at their articular ends; and these were deformed, tuberculated, and in some instances ankylosed; the ligaments thick, and the synovial fringes pronounced; much and disproportionate increase of fatty tissue, causing deformity and bulk; the arteries and nerves unaltered; the dorsal veins in part greatly thickened by fibrous formation in concentric sheets in their walls without increase of lumen; two outer toes quite free from hypertrophic change; the small muscles

¹ 'Dublin Journal of Med. Science,' xvii, 244.

² 'London and Edin. Monthly Journal of Med. Sc.,' 1843, p. 198.

³ Langenbeck's 'Archiv für klinische Chirurgie,' vii, 174, and pl. vi.

of the foot thin and pale, but the tendons passing from the leg, especially that of the *tibialis posticus*, very thick ; two small fat swellings in front of the tibia ; the tibia and fibula rather larger but not thicker than those of the other leg ; the thighs of equal length.

Busch's second case (No. 16) was a girl, aged twelve, with hypertrophic condition of the second and third toes of the right foot, which were over-extended and projected beyond the other toes. Being inconvenient, unsightly, and disproportionately increasing, they were removed, and the projecting end of the second metacarpal was removed also. The hypertrophy of the bones affected chiefly their ends (the epiphyses). The capsular ligaments were very thick, and contained cartilage nodules near their attachments. The joints were in other respects normal, as also were the arteries, veins, nerves, and tendons. The fatty tissue on the dorsal as well as on the plantar aspect was much increased.

Busch quotes a case (No. 17, from Graefe¹) where Klein amputated an hypertrophied forefinger of the left hand (sex and age not given), the second and third phalanges of which projected laterally over the other fingers. No vessel required ligature at the time, though there was some bleeding afterwards ; a case (No. 18) by Guersant² of hypertrophy of the fourth and fifth fingers ; a case from Böhm³ (No. 19) of a girl, aged sixteen, in whom the second toe of the left foot was three times as long and twice as thick as that of the other foot. The examination of the part when amputated showed nothing abnormal in the arteries and nerves. The plantar fat-pads were large, and the ligaments thick. (No. 20.) Wagner⁴ describes the case of a lad (aged eighteen) in whom all the right hand (except the thumb, which was smaller than that of the left hand) and the forearm were hypertrophied, and grew out

¹ From Graefe and Walther's *Journal*, vol. vi.

² '*Gazette des Hôpitaux*,' 1857, p. 463.

³ '*Inaugural-dissertation über Macrodactylie*,' Giessen, 1856.

⁴ '*Schmidt's Jahrbücher*,' iii, Supplementband, 1842, s. 66.

of proportion to the rest of the body. The end of the forefinger, which was small, was over-extended. The size was apparently due chiefly to fat-growths. There was also a fat-growth about the right breast extending from the sternum to the axilla, which had begun when he was five years old. (No. 21.) Legendre, quoted by Böhm, saw a child, aged four and a half, with hypertrophy of the fourth and fifth fingers and the ulnar side of the hand, chiefly on the palmar aspect. The fourth finger was bent backwards and to the radial side in consequence of inequality of growth of the two sides. (No. 22.) Ideler (in seiner 'Dissertation,' Berlin, 1855) gives the case of a lad, aged twelve, in whom there was hypertrophy of the three middle toes, including the metatarsal bones, of both feet, with lipomatous condition of the toes and soles and somewhat of the dorsa; several small lipomata in the left leg, and a large congenital lipoma in the left buttock. In consequence of the increasing deformity the foreparts of both feet were removed by amputation, and the metatarsals and phalanges of the three middle toes were of abnormal length. The other toes appear to have been rather undersized. (No. 23.) Wulff¹ gives the case of a man, aged thirty-two, in whose right hand the first three fingers (thumb, index and middle fingers) were congenitally hypertrophied. The growth had continued *pari passu* with that of the rest of the body, but the increase had been greater in the last few years. There was much enlargement of the bones, especially in the neighbourhood of the metacarpo-phalangeal joint of the thumb, the terminal joint of the index, and both the phalangeal joints of the middle finger; external bending of the fingers and great increase of the fat-tissue. The arteries were apparently alike in the two limbs. (No. 24.) Burow² mentions a Polish girl, aged six, with hypertrophy of the second and third toes with their metatarsals. The increase was proceeding quickly, and the parts were removed. (No. 25.)

¹ 'Petersburger med. Zeitschrift,' 1861, 10 Heft, s. 281.

² 'Deutsche Klinik,' 1864, No. 27.

Mr. Holmes¹ represents the cast of the left foot and leg of a child, aged twenty months, affected with congenital enlargement of the foot and leg, which was so inconvenient and on the increase that amputation in the leg was performed, under the impression, he believes, that the disease was of malignant nature. Anatomical examination, however, showed that the bulk was due to an unusual deposition of fat and cellular tissue, the muscles as well as the bones being normal.

It appears from the above-recited cases (more might doubtless be collected) that the parts more frequently affected with this congenital "overgrowth," "hyperplasia," "hypertrophy," or "macroductyly," are the digits on the inner—the radial and tibial—sides of the hands and feet, more particularly the second and third digit in the hand, and the first, second, and third in the foot; though in some cases (Nos. 20 and 21) the other digits were affected. In Nos. 6 and 22 the unaffected digits were somewhat undersized. The adipose tissue, the bones, and the skin² participated in the overgrowth, and usually in a proportionate degree; though in some the adipose tissue was increased to a disproportionate extent. The ligaments, the synovial fringes of the joints, and the tendons were in some observed to be enlarged. In No. 15 there was marked increase of the fibrous tissue in the coat of one of the veins. In this case also the articular ends of the bones were nodulated and deformed, and in one joint ankylosed, the parts thus presenting a resemblance to the condition often found in rheumatic arthritis, and to that sometimes observed in the acromegaly of adults. In the hand the condition was mostly limited to the digits, though in No. 13 the whole upper limb was involved; but in the foot it extended beyond the digits in several instances, the metatarsal bones

¹ 'System of Surgery,' iii, 798.

² I do not find it observed that the cutis or the cuticle was very thick, or the hair long or superabundant, in any of the cases, as is so often seen in "moles." The large size of the nails was a consequence of and proportionate to the large matrix from which they grew.

of the foot and even the bones of the leg (No. 15) being enlarged. The affection showed an especial tendency to spread along the sole of the foot, and the adipose tissue to grow up between the metatarsal bones.

The various tissues, except in No. 15, were simply hypertrophied (overgrown), but not otherwise diseased; and no abnormal condition of the blood-vessels, save the thickening of the veins in No. 15, or of the nerves was discovered in any case. The over-extension of the toes noted in some was probably caused by the adipose growth on the plantar aspect exceeding that on the dorsal; and the lateral curvature observed in the fingers was probably due to an irregularity in the growth on their two sides rather than, as suggested by Curling, to the influence of the extensor tendons.

In Nos. 7, 8, and 22 the condition was symmetrical or nearly so. It occurred about equally in boys and girls, in the hands rather more often than in the feet.

This sort of congenital overgrowth, attended usually with a relatively proportionate increase of the several tissues concerned, is not confined to the hands and feet. It occurs also in the face and other parts. I have recorded¹ the case of a girl, aged twelve, in whom there was congenital overgrowth or hypertrophy of the gums on the left side, without and within the alveolar border, which had increased so much as to bulge the cheek and project the lips, and cause such inconvenience as to render an operation for removal of the deformity necessary; the teeth, though in great measure covered by the mass, and the maxillary bone were normal. The lips on the left side were larger and thicker than natural, also the left ala of the nostril, and the left eyelids and eyelashes, and the hair of the eyebrow and that of the forehead, which latter descended lower than on the right side. The pinna of the left ear was a quarter of an inch longer and a little thicker than that of the right ear. The left tonsil and side of the palate and the papillæ on the left side of the

¹ 'Annals of Surgery,' iii, 1.

tongue also were larger than on the right side. I refer in that paper to other more or less similar cases. In my case the continuance of disproportionate increase was, I believe, confined to the gums. Instances of congenital hypertrophy of the lips have been observed by others;¹ and the cases of congenital hypertrophy of the tongue, in which all the tissues, some more and some less, are increased, are of the like nature.²

The real interest of these cases lies in their pathology, and its bearing upon other pathological conditions. They obviously consist in an excess, an abnormally excessive growth of a normal part of the body—an excess not depending upon any superabundance of nutritive supply or any modification of nerve-influence, but upon an excess, a want of due restraint, of that developmental force by which the several organs and structures acquire and maintain their proper dimensions and relations to one another, and by which their relative growth at different periods of life and under different circumstances (as of the genital organs at puberty) is determined. The nature and essence, and habitat or source of this force is a mystery, perhaps past finding out. It seems to be shared, as an inherent quality, by each part and by each tissue in the same manner as by the primitive germ, and as a derivative from it. Each part forms and grows by the *vis inertix* in itself, though for the supply of the material by means of which it forms and grows it is dependent upon external sources, as the blood in the vessels, and for its co-operation with other parts upon nerve-influence; just as each soldier in a regiment has his own independent force and activity, but depends upon the

¹ Ashurst's 'International Encyclopædia of Surgery,' v, 463.

² Now and then a similar overgrowth commences later in life, as in the case of a woman, aged thirty, mentioned by Cohnheim ('General Pathology,' ii, 750), in whom hypertrophy of both hands and the lower part of the face thus took place. It seems probable, however, that this should be regarded as a case of "acromegaly," which, I may observe, is a morbid condition occurring usually in adults and affecting the system generally, not, like "macro-dactyly," a localised congenital overgrowth.

commissariat for his maintenance, and the trumpet call for harmonious co-operation with other members of his corps. He may of his own free action take an insubordinate line, to the detriment of his fellow-soldiers and the damage of the service; and he may involve others by his example and influence. The like insubordination to the controlling and harmonising forces of nutrition and growth may be supposed to occur in any tissue or at any period of life. It may continue or it may cease. It may remain localised or it may spread to surrounding parts. It may consist in, or lead to, a mere increase and maintenance of *normal* structure, or it may result in various degenerations or deviations from the normal. It may be attributable to an obvious local cause or stimulus, and may cease with that cause; but in many instances no such cause can be assigned.

Admitting the view thus taken as a working hypothesis, not regarding it as a full explanation, for that is unattainable in our ignorance of the nature of developmental and growing forces, but referring these macrodactyls and other abnormal growths to an over-exercise of that force by which each part attains and maintains its size and structure, we find, I think, a better idea and explanation, or theory, of the nature of tumours than that afforded by the "latent embryonic germ theory" propounded by Cohnheim, and too readily, as I believe, accepted by many modern pathologists. It seems, indeed, a piece of supererogation thus to increase our difficulties by resorting to this view, which has *two* postulates instead of one: *first*, the presence of the latent germs, of which I need scarcely say there is no evidence; and *secondly*, the starting of these germs into a mischievous or insubordinate activity without any assignable cause.

Let us trace this simple theory of "overgrowth" or "hyperplasia" which I am advocating, and have for years maintained and taught, as against the "latent germ theory" in its application to various growths.

The congenital MACRODACTYLS and other congenital

hypertrophies above described are obviously mere enlargements or overgrowths of normal tissues, of a finger, a toe, a lip, or a tongue, which in some instances proceed indefinitely, in some cease to increase after a time, in some extend to the surrounding tissues, and in some remain limited to the part first affected.

NÆVUS is a similar condition of blood-vessels, commencing usually a little before birth, and spreading for a time, but commonly for a limited time only.

MOLES or MOTHER-MARKS, in which the cutis is thick and pigmented, sometimes nævoid or tuberculated, and usually with overgrowth of hair, now and then continue to increase after birth, or start an increase at some later period, as in a case I lately saw where the tubercles grew out into masses requiring removal.

The other FŒTAL TUMOURS, consisting of cysts, *serous* or *dermoid*, of cartilage, bone, fat, or other structures (the so-called "parasites" are probably, for the most part, of this nature), often exhibit, as might be expected at the time of life when development is in high activity, an insubordination of developmental force as well as of growth, which leads to variation, it may be to undue exaltation, of structure, as well to increase of size, as evinced by the presence of cartilage, bone, skin, and even glandular structure. These tumours usually remain localised, and commonly, as exemplified by the supra-orbital dermoids, cease to grow after a time, their developmental and growing tendencies ceasing with the diminishing developmental and growing forces of the body. They are fully as well accounted for by an excessive growth and change of normally existing germs as by the presence of superabundant germs and an excessive growth of them. That such manifestations of variety and exaltation of structure should be observed in the ovary (they are probably congenital or occurring in early life) is in accordance with the marvellous formative properties of the Graafian bodies of that organ when normally acting under the influence of the natural stimulus.

With regard to the extra-uterine growths, a **WART** is a localised enlargement or overgrowth of the papillary tissue of the skin, continuous with the surrounding skin and spreading into it, the overgrowth being commonly excited by some local irritation. **POLYPI** are of like nature, not spreading so much into the mucous membrane with which they are continuous as growing in the direction of least resistance. The **DIFFUSED LIPOMATA** of the neck and the **DIFFUSED MYOMATA** of the uterus, **PERIOSTEAL FIBROIDS**, and **EPULIS** are clearly, like macrodactyls, localised overgrowths of the respective tissues, started into activity by some unknown cause. The continuity of these growths with the tissues in which they are found, and the manner in which they spread into these tissues by exciting the like overgrowth in them, seem sufficient evidence of their nature and derivation from normal structures, and to be incompatible with the idea of their derivation from latent and suddenly active superabundant germs.

The more **CIRCUMSCRIBED TUMOURS** are but a step removed from these last, in that the insubordination of growth is, and remains, more limited. Moreover, in some of these the limitation is not absolute—that is to say, the growth is not quite confined to the starting-point, but extends to a certain extent in the surrounding tissue. This, at least, we may infer to be the case in many of the subcutaneous lipomata from their lobulated character and the manner in which they are penetrated by fibrous septa passing into them from the skin, and giving the characteristic dimpling or fissuring of the surface. They are most frequent in the persons and parts where the growth of normal fat is greatest, and they sometimes take their start at many points. The **MAMMARY ADENOMATA** are also good illustrations of localised overgrowth of a normal structure, composed of modified mammary tissue, usually remaining continuous with the mammary gland, and apparently, in some cases, owing their increase partly to an extension to or an involving of it. The tendency to this insubordinate growth may exhibit itself at any part, giving rise to two

or three tumours in a mammary gland, to a dozen in a uterus, and to a hundred or more in the subcutaneous fat. They usually present the general structural features of the tissue in which they are found, though in some instances, as by the presence of cartilage in the testicle and the salivary glands, they show developmental variations from the normal connective tissue of the part.

The osseous system is fertile in an interesting and instructive gradation of these more or less insubordinate productions, ranging from the callus, often excessive after fracture, and the osteophytes about joints, ulcers, and necroses, through the varieties of scleroses and nodes, to the ossifications into tendons, exostoses, enchondromata, and osteomata. Some of these are the result of an increased supply of blood caused by congestion of blood-vessels from various causes, while others take place without any apparent cause, and can only be ascribed to an overgrowing of the cartilage or bone structure where they spring; and in proportion to their independence of any known cause are they resistant of any known treatment.¹

The **MALIGNANT GROWTHS** fall into the same category. The insubordinate growth, set agoing often by some continued irritation, when once begun spreads along the adjacent tissue; and the pertinaciously multiplying germs of the tissue in which they form insinuate themselves into the surrounding structures, reaching the lymph- and blood-streams, and carrying their evil influences wherever they go. This is well shown by the carcinomata, the epithelial growths of which infect the surrounding epithelium, pass into the subjacent tissue, infiltrating it, partly destroying and replacing it, and partly giving rise to a low fibroid hyperplasia of its connective tissue, whereby is formed the areolar network in which the cancer-cells and germs lie

¹ The little pieces of cartilage occasionally found in the shafts of rickety bones, as the remnants from imperfect and irregular ossification at the epiphysial lines, do not really afford any argument in favour of the embryonic germ theory of tumours, forasmuch, as far as I am aware, they do not ever become developed into tumours.

nested. The functionless included products of these germs, being out of the range of normal metabolism and the natural outlets for the epithelium, die and decompose, and force an abnormal exit through the medium of ulceration or mortification, while the infiltrating and spreading products are carrying the like destructive influence to neighbouring and to distant parts.

Into the primal cause of tumours, that which first excites and gives continuance to the impulses of inordinate growth and assimilative power, we can, as I have already said, no more penetrate than we can into the primal cause and regulation of normal growth and nutrition. The gradations I have mentioned from callus to osteomata, and those between simple warts, warty epitheliomata, and infiltrating epitheliomata, and the known exciting causes of some of these, may help us to approach a somewhat nearer knowledge of the ætiology of the tumours, but a clear conception of it must await a closer insight into the laws of nutrition and growth. I wish here merely to accentuate the view that whatever may be their several exciting causes, and however much they may differ in their characters and progress, macrodactyls and nævi, warts and tumours, simple and malignant, are essentially alike in the feature of being overgrowths of the parts or tissues in which they take their origin.

I can quite agree with Cohnheim that there is "no fundamental difference between foetal and extra-uterine growth," and that the real cause of a tumour may be "sought in a fault or irregularity in the embryonic rudiments." Indeed, some such faults or irregularities, evincing themselves in the course of the developmental progress of those rudiments, or rather of the structures resulting from them in any of the several stages from the foetal to the senile state, may be regarded as the source of a large number of the weaknesses and maladies, tumours among others, which occur at various periods of life. They constitute, indeed, a widely embracing factor in pathology; and the body which is most free from such faults is least

prone to disease and best fitted to hold on through the greatest length of time.

Postscript.—Mr. William Anderson, in a valuable paper in ‘St. Thomas’s Hospital Reports,’ vol. xi, gives a case of giant growth, apparently congenital, of the left lower limb, with tumour formation in connection with the superficial parts, in a woman æt. 25. The growth was progressive, and increased most rapidly after the ordinary body-growth had almost reached its complete development. Many cases of congenital hypertrophy are referred to, and much information on the subject given.

(For report of the discussion on this paper, see ‘Proceedings of the Royal Medical and Chirurgical Society,’ Third Series, vol. iii, p. 60.)